NPP outlook at BNL and C-AD

(note the new name for Directorate)

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C-AD retreat
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BROOKHAVEN NATIONAL LABORATORY

C-AD this year

- The machine performance was once again great especially in light of the quick change of running plans – *but I know at this retreat you're looking to make things better*
- EBIS progress looks good – *keep at it !!*
- Stochastic Cooling great progress
- e-cooling R&D getting funding from a variety of sources and proceeding well

Still a lot to prove to others this summer!

A busy summer of meetings/reviews

- July 17-22 – QCD at high energy planning meeting
- July 21 – NSAC meeting preparing for NP Long Range Plan
- July 24-26 – DOE RHIC S&T review
- August 14-16 – NP Operations review
- September 12-14 – PAC meeting

Safety

- I know that C-AD has had an outstanding record, but I know you and the rest of the Lab can do better
- Would appreciate ideas to improve safety conditions or performance
- There has been a blizzard of acronyms related to safety, but the bottom line is

We don't want you to get hurt

Last year's outlook at this meeting

Some comments I made last year –

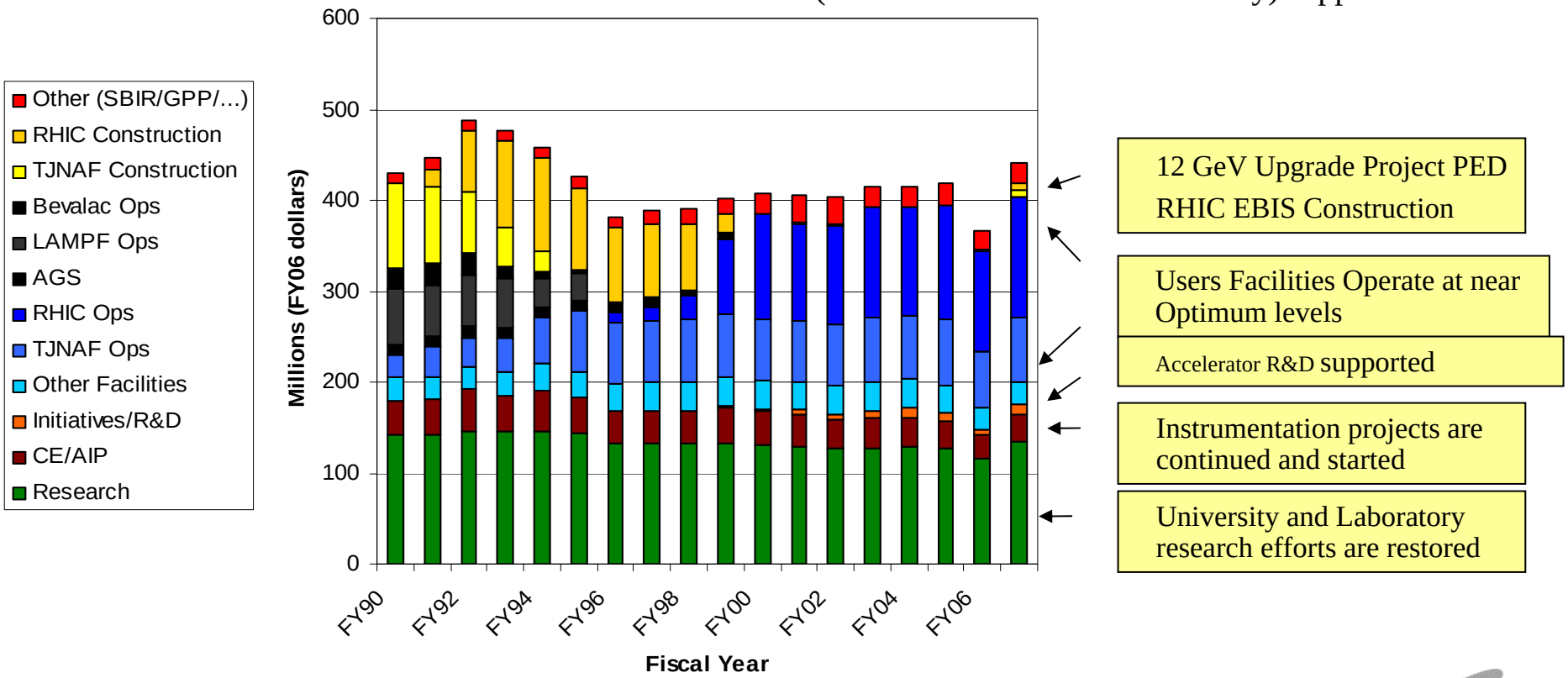
- FY06 Presidential budget terrible with projections even worse
  - Prompted an NSAC subcommittee to evaluate possible closure of RHIC or CEBAF as they total about ½ of NP budget
- Relatively small increase in funding would solve a lot of issues
- Success depends upon many forces, but especially the new DOE secretary
  - FY07 budget will be the first sign as to priorities

What a difference a year makes !!

DOE SC NP Program in FY 2007

FY 2007 Budget Request supports a strong productive program that develops needed research capabilities

- Facility Operations continue to take lion's share of budget (~55%)
- Important investment for RHIC, CEBAF and high priority scientific opportunities
- Research efforts are restored & accelerator R&D (RHIC II and exotic beam facility) supported



Budget Status

- House has passed Budget at Presidential Level
- Senate Appropriations Committee has changed funding and would impact BNL (and others) negatively
- What will the conference committee do ??

Other sources of funding

- NASA looks solid for the moment with possible real growth
- Navy funding some of the FEL work also with possible real growth
- Possible design of medical synchrotron
- Lots of “ifs” in HEP for C-AD
  - g-2 awaits P5
  - Neutrinos await priority and competition from FNAL
    - Strong science case and BNL the right design, but …….
- Could probably get larger DOD funding but have been avoiding classified work

Priorities, Vision, Outlook

The #1 priority for Nuclear Physics at BNL, present and future,

is *RHIC*

- RHIC has been and is running spectacularly both for HI and for polarized p (due to C-AD with thanks to DOE and Renaissance Technologies)

Near term

Exploit the scientific opportunities at RHIC

- Enormous gains in knowledge will continue to be made (in A+A and Spin) with near term upgrades and incremental improvements
  - Luminosity, polarization, DAQ, particle ID, η coverage
- Optimized operations
  - Running time vs. investment (for efficiency and the future)
- Research support
  - Experimental – Research & ops support, detector R&D
  - Theory support – including thermodynamics on the lattice

Mid-Term Strategy: 2006 - 2011

Two large detectors well equipped for RHIC II physics

Phased implementation of key upgrades for PHENIX and STAR detectors (including help from non-DOE funding and collaborative resources) to study the new form of matter with resolving power afforded by hard probes

At the same time continued improvements in machine performance proceed

RHIC II luminosity upgrade *(electron-cooling of ion beams)* proceeds along technically-driven schedule

Annual data runs during this period will exploit these upgrades for critical advances in the Heavy Ion and Spin physics programs

Longer Term

Evolve RHIC into "QCD Laboratory"

(we need to think of a different name)

- Address the compelling questions in QCD revealed by the discoveries at RHIC
  - Involve the RHI, Spin and DIS communities in articulating the future science of RHIC and eRHIC
- R&D/investments → the tools and techniques needed to address the scientific questions

What is QCDLab ?

- e-cooling is implemented, detectors are upgraded
- A 10GeV electron injector is added to RHIC – *should it be ring-ring or linac-ring ?*
- Computing power (e.g. BlueGene–L) is added to allow more powerful theory calculations

- The result – $A–A, A–B, \vec{p}–\vec{p}, e–A, \vec{e}–\vec{p}$ all possible

a phenomenal facility for study of QCD

What are the hurdles to be overcome ?

- The technical and science hurdles are the “easy” ones
- Last year with the significant cut in NP funding any large facility appeared unlikely. The FY07 Presidential budget changed that outlook, but a number of challenges remain
- Issues
  - Making the HI science case once LHC begins
  - Need to collaborate with TJLAB on science case for QCDLab
  - TJLAB (12 GeV), RIA, other DOE offices for funding
  - Cost

Making QCDLab real

- First steps are meetings like the workshop July 17-22 at BNL – experts make a convincing science and technical case to themselves

- Must then make the case to the General NP community for the 2007 Long Range Plan

And

- *Keep in mind the arguments for other audiences*
  - DOE, OMB, and Congress

  These audiences may require less detail, but need compelling reasons and each audience is vital to success

Bottom Line

- A lot of exciting potential, but some challenges ahead
- C-AD performance with RHIC has been outstanding – important to keep it up, recognize the funding issues, try to increase efficiencies (cost) to enhance probability of new projects

Summary

- RHIC's success has made BNL a world center for
  - Heavy Ion Physics
  - Spin Physics
  - Nuclear Theory (high T, high ε, high E, low x)
  - Accelerator science
- A clear (non-trivial!) path leading to a QCD Lab
  - A+A, p+A, $\vec{p}+\vec{p}$, $\vec{e}+\vec{p}$, e+A
  - New detector capabilities, higher luminosity and polarization

This path has ***discovery potential*** every step of the way and C-AD plays a vital role !